

ACCESSION #: 9603010188

LICENSEE EVENT REPORT (LER)

FACILITY NAME: Seabrook Station PAGE: 1 OF 4

DOCKET NUMBER: 05000443

TITLE: Automatic Reactor Trip

EVENT DATE: 01/27/96 LER #: 96-001-00 REPORT DATE: 02/27/96

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: 1 POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION:

OTHER

LICENSEE CONTACT FOR THIS LER:

NAME: Mr. Anthony M. Callendrello,

Licensing Manager TELEPHONE: (603) 474-9521

extension 2751

COMPONENT FAILURE DESCRIPTION:

CAUSE: SYSTEM: COMPONENT: MANUFACTURER:

REPORTABLE NPRDS:

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

On January 27, 1996 at 0945 an automatic reactor trip occurred at 100% power. The reactor trip occurred due to high Pressurizer pressure. The turbine combined intercept valves closed in response to the insertion of a fast close signal due to position mismatch. Concurrently, the turbine control valves closed due to the insertion of a slow close signal. The resulting turbine load rejection caused the Reactor Coolant System temperature and pressure to increase. This event was reported to the NRC pursuant to 10CFR50.72(b)(2)(ii), actuation of the Reactor Protection System and Engineered Safety

Feature system. There were no adverse safety consequences as a result of this event.

The turbine combined intercept valve and control valve closure was caused by a failure of a circuit card in the turbine speed control circuit in the Electro-Hydraulic Control system. This resulted in a large speed error signal and valve close signal to the combined intercept valves and control valves.

The root cause of this event was determined to be random failure of an Electro-Hydraulic Control speed control circuit card.

North Atlantic has taken immediate corrective actions including replacing both of the Electro-Hydraulic Control speed control circuit cards. Long term actions include performing several evaluations related to the design and handling of Electro-Hydraulic Control circuit cards.

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On January 27, 1996, at 0945, with the unit operating at 100% power, the low pressure turbine [TRB] combined intercept valves (CIVs) closed in response to the insertion of a fast close signal due to position mismatch. The main turbine control valves (CVs) concurrently closed on insertion of a slow close signal. The CIV and CV closure was initiated by a false high speed error signal (valve closure demand) which resulted in a CIV position error of greater than five percent causing a CIV fast closure.

The CIV and CV closure was initiated by failure of one of two "low value gate" circuit cards in the turbine speed control circuit in the Electro-Hydraulic Control (EHC) [TG] system. This resulted in a large speed error signal and valve close signal to the CIVs and CVs.

Following closure of the CVs and CIVs, the resulting turbine load rejection caused the Reactor Coolant System (RCS) [AB] temperature and

pressure to increase. An automatic reactor [RCT] trip occurred due to high Pressurizer [PZR] pressure. Both Pressurizer Power Operated Relief Valves (PORVs) cycled open for a brief period in response to the primary side transient. Both valves functioned normally and exhibited no evidence of leakage after final closure. The primary safety valves were not challenged during this event. The highest primary system pressure was 2,387 psig. The condenser steam dump valves opened as designed, reducing the RCS temperature to the no load value and the transient was terminated rapidly.

A transient associated with the EHC system for the main turbine preceded the reactor trip and several associated alarms. The highest priority alarm was "EHC MALFUNCTION". The Unit Shift Supervisor (USS) acknowledged the EHC alarm report from the Control Room Operator (CRO). The control rods were observed stepping inward. The operating crew determined that the turbine load was decreasing. The load quickly went to zero Mwe and the CRO promptly reported this to the USS. The USS immediately ordered a reactor trip. Before the Senior Control Room Operator (SCRO) manipulated the reactor trip switch, the reactor automatically tripped on high pressurizer pressure. The turbine tripped approximately one-tenth of a second after the reactor trip, The following Engineered Safety Features (ESF) actuations occurred immediately following the reactor trip, as expected.

Emergency Feedwater (EFW) on Steam Generator Lo-Lo Level

Feedwater Isolation (FWI) on Low T sub avg Coincident with a Reactor Trip

The USS announced the reactor trip and entry into Emergency Response Procedure, 'Reactor Trip And Safety Injection.' The crew performed their immediate actions, continued with the procedure and concluded no safety injection had occurred, and was not required. The USS announced a transition from the Emergency Response Procedure to the Reactor Trip Response Procedure. The following plant conditions were noted following the reactor trip.

MAIN GENERATOR HYDROGEN LEAK

At 1223 a report was sent to the Control Room from the Work Control Coordinator (WCC) about a possible hydrogen leak in the Turbine Building. The USS immediately dispatched the Fire Brigade Leader (FBL) and the duty Fire Fighter to investigate the potential leak. The operating crew verified all available Turbine Building roof fans were operating to disperse the hydrogen. The FBL called the Control Room and confirmed that the leak was hydrogen from a Main Generator Hydrogen Cooler flange.

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The Shift Manager reviewed the Emergency Response Manual Procedure, "Classification of Emergencies. The Shift Manager discussed the potential for ignition of the hydrogen with the FBL. Because the ceiling of the Turbine Building is 50 feet above the top of the generator and the roof fans were running, the FBL indicated that it was unlikely that any pockets of hydrogen would accumulate and that ignition was unlikely.

The Shift Manager concluded that the hydrogen leak would not adversely impact station operations and informed the crew of his decision. At approximately 1 309 the Shift Manager determined that the plant conditions did not meet the initiating criteria for an Unusual Event declaration. He then instructed the USS to use the emergency evacuation portion of the generator hydrogen system to quickly lower the pressure of the generator to minimize hydrogen leakage. The operating crew then used the normal procedure for purging the generator with CO, to remove all hydrogen from the generator.

The generator hydrogen cooler flange leak was determined to be a result of a gradual relaxation of the flange bolt torque and was not related to the plant trip.

CONDENSATE/FEEDWATER PRESSURE TRANSIENT

The modifications performed on the main feed pump (MFP) speed controls and the FRV and FWIV stroke times following the June 18, 1995 unit trip were very effective. The pressure transient resulting from the feedwater isolation (FWI), was reduced in magnitude and duration in comparison to previous events.

The feedwater heater tube side thermal relief valves, were not damaged during this event as they had been on previous unit trips.

Safety Consequences

There were no adverse safety consequences as a result of this event.

Plant equipment functioned as designed. Plant equipment functioned as

designed and operator actions were reviewed and determined to be conservative and correct.

Root Cause

A Root Cause evaluation was performed as an immediate response to this event. The evaluation concluded that the circuit card failure appears to be random in nature. This is based on detailed troubleshooting of the two circuit cards removed and a review of the industry operating experience.

Corrective Actions

Immediate

Following the plant trip, the immediate corrective actions included determining the source of the failure. A General Electric (GE) representative, assisted by North Atlantic Technicians and System Engineers, performed a comprehensive troubleshooting and repair effort of the EHC system. The troubleshooting isolated the failure to the low value gates for the speed error EHC circuit cards. The failure was duplicated during initial troubleshooting efforts, but later cleared and could not be repeated during later troubleshooting efforts. It was not finally determined which of the two circuit cards was the source of the fault therefore, both circuit cards were replaced.

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A review was performed of the maintenance recommendations in the General Electric (GE) Manual for the EHC system and it was confirmed that there

is no requirement or recommendation for replacing printed circuit cards or components as a preventive maintenance activity.

Prior to the plant restart, the main generator hydrogen leaks were repaired.

Long Term

Further investigation of the circuit cards that were removed from the system will be performed to attempt to identify the failed card, the exact component on the card that failed and the failure mechanism. This information will be used to determine if further corrective action is warranted for circuit cards in other protective systems in the plant.

North Atlantic is evaluating an upgrade to the Mark V EHC control system during the sixth refueling outage. As appropriate, the scope of EHC system testing and calibration will be enhanced during the fifth refueling outage.

Plant Conditions

At the time of this event, the plant was in operational Mode 1, at 100% power, with a Reactor Coolant System temperature of 587 degrees Fahrenheit and a pressure of 2235 psig.

Prior Events

There have been three EHC related plant trips at Seabrook Station since power ascension testing. The first event occurred on July 5, 1990 (LER 90-018) and was related to excessive vibration of EHC pressure switches due to their mounting locations. The second event occurred on August 22,

1 990 (LER 90-022) and was related to a loss of voltage on the EHC bus during troubleshooting activities in the EHC cabinet. The third event occurred on June 2, 1 991 and was related to a stuck open oil trip solenoid valve during weekly surveillance testing. Based on the evaluations of these events and the information related to the current trip, there is no apparent relationship to the current event.

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North North Atlantic Energy Service Corporation

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The Northeast Utilities System

NYN- 96014

February 23, 1996

United States Nuclear Regulatory Commission

Washington, D.C. 20555

Attention: Document Control Desk

Reference: Facility Operating License No. NPF-86, Docket No. 50-443

Subject: Licensee Event Report (LER) No. 96-001-00, "Automatic
Reactor Trip"

Gentlemen:

Enclosed, please find Licensee Event Report (LER) No. 96-001-00 for
Seabrook Station. This submittal documents an event which occurred on

January 27, 1996. This event is being reported pursuant to 10CFR50.72

(b)(2)(ii).

Should you require further information regarding this matter, please contact Mr. Anthony M. Callendrello, Licensing Manager, at (603) 474-9521, extension 2751.

Very truly yours,

William A. DiProfio

Station Director

WAD/JMPjr:sm

Enclosures: NRC Forms 366/366A

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United States Nuclear Regulatory Commission February 23, 1996

Attention: Document Control Desk Page two

cc: Mr. Thomas T. Martin

Regional Administrator

United States Nuclear Regulatory Commission

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